IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
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First named inventor:	Thomas Robieu
Serial No:	10/711,950
Filing Date:	10/15/2004
Title:	Overload Protection Device and Machine Tool Having Such Overload Protection Device
Examiner:	Nathaniel C. Chukwurah
Art Unit:	3721

RESPONSE TO NOTIFICATION OF NON-COMPLIANT APPEAL BRIEF

SUBMISSION OF AMENDED BRIEF (REPLACEMENT SECTION)

In response to the Notification dated 4/24/2007, Appellant herewith submits an amended brief by filing replacement section "SUMMARY OF CLAIMED SUBJECT MATTER" to replace said section of the appeal brief filed 3/12/2007.

It has been stated in the Notice of Non-Compliant Appeal Brief that "*Summary of claimed subject matter must identify and mapp all independent claims on appeal (claim 1) to the specification by page and line number or paragraph number and/or drawings, if any.*".

It is respectfully submitted that the "SUMMARY" section (pages 7 to 9) of the Appeal Brief dated 3/12/07 contains several references to the figures as well as to the specification:

- 1st paragraph of page 7, line 1;
- 2nd paragraph of page 7, line 1;
- 4th paragraph of page 1, line 2;
- lines 3 and 4 of page 8;
- lines 21-23 of page 8.

Appellant has now added more references to specification and Figures into the "SUMMARY" in order to comply with the Notice dated 4/24/07. It is respectfully requested that the replacement section be entered in order to overcome the deficiencies in the appeal brief.

Respectfully submitted on May 24, 2007,

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GEH/Encl. replacement section "SUMMARY" (pages 7-9)

SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1 refers to a portable device *(see Fig. 1; Para 67 to 70 of the specification)* with overload protection device for a motor-operated tool and comprises a drive motor (4); a drive shaft (1) connected to the drive motor (4) and driven in rotation by the drive motor (4); an output shaft (2) for driving a cutting tool (5), wherein the output shaft (5) is arranged substantially perpendicularly to the drive shaft (1); a drive pinion (7) connected to the drive shaft (1); a drum (8) supported on the output shaft (2) and driven in rotation by the drive pinion (7); and a coupling (3) arranged between the drum (8) and the output shaft (2) and engaging the drum (8). The coupling (3) is connected to the output shaft (2). When the output shaft (2) is blocked, the coupling (3) effects an automatic decoupling between the drum (8) and the output shaft (2) in order to prevent overloading of the drive motor (4); *see Para 77 of the specification*. The coupling (3) is forced against the drum (8) by centrifugal force generated by rotation of the output shaft (3); *see Para 75 of the specification*.

Claim 18 concerns an overload protection device *(Fig. 12; see Para 102, 107 of the specification)* for an electric machine tool having an electric motor (104) and a drive train (motor shaft 133, a shaft stub 129; gearbox 107; output shaft 102) for driving a tool (105), wherein the drive train comprises a gearbox (107). The overload protection device (103) comprises a drum (108) having a circumferential wall and at least one fly body (120) engaging the circumferential wall of the drum (108). The drum (108) and the at least one fly body (120) are mounted in the drive train (101, 107, 102) between the electric motor (104) and the gearbox (107). The drum (108) is arranged at an input side (motor side) of the drive train and the at least one fly body (120) is arranged at an output side (tool side) of the drive train.

Claim 26 refers to a machine tool having an overload protection device as claimed in claim 18.

The gist of the claimed embodiments is that, in contrast to the known centrifugal couplings *(see Para 8 of the instant specification)*, where the inertia bodies (fly bodies) are mounted on the drive shaft and forced centrifugally outwardly against the coupling drum mounted on the output shaft when the drive motor is started, the present invention employs the reverse arrangement in order to provide overload protection as well as an automatic coupling of drive shaft and output shaft when the motor is started.

In the present invention, the coupling with its fly bodies is mounted on the output

shaft (the shaft at the tool side) and the drum is drivingly connected to the drive shaft (the shaft at the motor side), i.e., the drum is rotated as the motor is started but no centrifugal force is acting on the fly bodies at the time of starting the motor. The operation of the coupling and its fly bodies is described in detail in *Para 75 to 78 of the specification*.

The fly bodies 3a-3d of the first embodiment (claim 1) are forced by a small spring force (14a-14d) against the circumferential wall of the drum 8. This causes minimal friction between the drum 8 and the fly bodies as the motor 4 is started. The spring force is so small that the tool must be free of any load; otherwise the friction will not be sufficient to cause the fly bodies 3a-3d to be entrained by the drum 8. Due to the weak frictional engagement, the rotary speed of the output shaft 2 and thus that of the fly bodies 3a-3d connected thereto increases slowly until the centrifugal acceleration is sufficient to cause the fly bodies 3a-3d to be forced outwardly with great force against the inner circumferential wall 9 of the drum 8. This contact enables the transmission of a drive torque that is greater than the starting torque caused by residual friction. After static friction has been established, the contact is maintained automatically and increased with further increase of the rotary speed of the output shaft 2. Accordingly, the torque to be transmitted will increase until the maximum output of the device is reached and the tool 5 can be used for machining workpieces. The coupling can be set such that a decoupling action will occur at 2,000 rpm.

The embodiment as claimed in claim 18 employs the same principle except that coupling 120 and drum 108 are arranged between the motor 104 and the gear box 107 *(see Fig. 12)* instead of downstream of the gearbox *(as in Fig. 1)*. The coupling/decoupling action is the same as described above. *The specification sets forth the operation of this arrangement in Para 119 to 121.*

The arrangement of the drum on the drive side so that the drum is subjected to the driving action of the drive pinion or of the drive shaft and of the centrifugally acting coupling on the output side (tool side) is counterintuitive because a centrifugal coupling requires the centrifugal parts to be acted on by the drive motor in order to cause the weights to move by centrifugal force outwardly into engagement with the drum. The present invention has found a solution to the seemingly inoperative arrangement by providing initial minimal friction acting between the fly bodies of the output shaft and the driven drum. The minimal friction ensures that the output shaft and the tool, when free of load, can be accelerated

when the motor is started. The entrainment of the output shaft by minimal friction then causes centrifugal forces to be generated at the output shaft and, above a certain speed, the centrifugal forces are great enough to drive the tool.

On the other hand, the overload protection of the coupling happens basically instantly when the tool is blocked. When the tool jams or is blocked, the centrifugal acceleration that has caused the fly bodies 3a-3d, 120 to engage the drum will be canceled very quickly so that the driving engagement that enabled the transmission of the driving torque onto the output shaft 2 or 102 is interrupted. The fly bodies 3, 120 are no longer acted on by centrifugal force and slip relative to the driven drum. The drive shaft and the output shaft are no longer connected with one another. Therefore, no recoil or kick is experienced by the operator. The motor 4, 104 continues to rotate without causing the output shaft to rotate *(see Para 77 of the specifcation)*. The cancellation of centrifugal force acting on the fly bodies leads to instant decoupling without requiring a braking action or shutdown of the motor side and the drum. The overload protection according to the invention acts as a safety device substantially without any delay because the drive motor can continue to run.

This can even be permanent without causing excessive wear or overheating of the motor. The device cannot automatically couple again as long as tool 5 is blocked. As in the start-up situation, only minimal friction is present that is negligible in comparison to the torque of the tool blockage. The present invention thus provides for very safe operation.

Complete separation between drive side and driven side is actually realized in an overload situation. When the operator starts the motor while the tool is blocked, the motor and drum can rotate freely without entraining the fly bodies that are stopped by the blocked tool and therefore not acted on by any centrifugal force. This arrangement therefore causes no or only minimal frictional heat. Overloading of the arrangement is prevented.

In summarizing the above, the present invention resides in that the drum is connected to the drive side of the motor; the coupling is connected to the output side where the tool is connected. This enables a slow automatic starting of the tool and at the same time an instant decoupling of the tool from the drive shaft and motor in case of blockage so that the drive motor is safe from overload.